SP-E4: FLOOD MANAGEMENT STUDY

UPDATE

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Stakeholder Issues

- EE11—coordinate releases with other water storage facilities for flood release
- EE17—update flood operation manual
- EE19—early warning system for downstream releases
- EE21—outflow impacts to downstream flood risk (levee stability) COE?
- EE22—stability of Oroville levee system through low flow section and effects of high flow
- EE23—evaluate channel capacities and potential need for more storage / flood protection engineering and operations deflection into levees by gravel bars
- EE47—in the FERC Part 12 guidelines, the Probable Maximum Flood (PMF) is to be examined after each major flood event. The Feather River has had two major flood events since 1971; once in February 1986 and again in January 1997. The FERC Part 12 regulation guidelines also state that when new Hydro-meteorological Reports (HMR's) are issued, the PMF is to be re-examined. New HMR's (HMR 58 & 59) were issued in 1999, thus precipitating the Oroville 2100 project to be re-examined in light of the new data. I think that this has been done for the 2100 project in the last Part 12 inspection and the Work Group should be given the correct data. If not done, the question is why not?
- EE51—provide the Work Group with the study data done on installing Obermeyer Gates on the emergency spillway ogee to raise the reservoir elevation in a major flood runoff event? What is the probability of this installation?
- EE52—provide the workgroup with the latest PMF, HMR, and PMP (probable maximum precipitation) data?
- EE53—when was the last "Inflow Design Flood" (IDF) study done and was it done on current data?
- EE56—prepare flood inundation maps for a 1997(?) worse case with 300,000 cfs coming out of the dam's normal and emergency spillways. In 1997, it is believed that Oroville storage was almost to a point where the 300,000-cfs of inflow was going to pass through the reservoir. DWR was making plans to evacuate the power plant. The 300,000 would have topped the levees and put 10 feet of water into the town of Oroville.

General Approach

- Evaluate and, if necessary, update existing studies to reflect current conditions, technology and information
- Identify and evaluate potential future alternatives regarding flood management
- Coordinate with and incorporate the results of relevant studies being done by other agencies as listed in Task 1, 2 and 3 of the study plan

Methodology

- Task 1: Review existing or in-progress literature on Feather River floods
- Task 2: Update studies if the review of the existing and in-progress studies shows that current information would significantly change the conclusions of these studies
- Task 3: Coordinate and cooperate with ongoing studies by other agencies
- Task 4: Prepared report summarizing the work completed in each task

Study Plan Status

- Reviewed the 7 existing or in-progress studies identified in Task 1
  - Feather River Backwater Analysis by Corps of Engineers 2001
  - Forecast Based Operation (Advance Release) of Oroville Dam
  - Sacramento and San Joaquin River Basins, Comprehensive Study
  - Yuba-Feather Supplemental Flood Control Project
  - Sutter County Feasibility Study
  - Emergency Action Plan (EAP) for Oroville Facilities
  - Oroville Dam-PMF (Probable Maximum Flood) Analysis

Status Continued

- Reviewed Levee Information
  - Levee Inspection Records
  - Local Levee Ownership

Feather River Backwater Analysis by Corps of Engineers 2001

- Initial Findings
  - Result are available for the Feather River from Oroville Dam to the mouth of the Yuba River
  - A second study covering the reach from the mouth of the Feather at the Sacramento River to the mouth of the Yuba River is underway and will be completed in late 2003

Feather River Backwater Analysis by Corps of Engineers 2001

- Initial Findings Continued
  - Input data was derived largely from the comprehensive study
  - The study was done to FEMA standards
  - Its use is limited for the development of flood control projects

Forecast Based Operation (Advance Release) of Oroville Dam

- Initial Findings
  - FBO on the American River
    - HEC has determined that there is a potential for significant flood protection benefits
    - There is a risk of false alarms
    - Benefits may not truly offset the cost
    - Storage encroachment in good weather may mitigate for cost to water and power users
    - Identified a need for additional studies

Forecast Based Operation (Advance Release) of Oroville Dam

- Initial Findings Continued
  - FBO on the Feather and Yuba Rivers
    - FBO at New Bullards Bar has no significant benefit unless the outlets are enlarged
    - FBO benefits are also limited by insufficient Oroville outlet capacity at lower water elevations

Forecast Based Operation (Advance Release) of Oroville Dam

- Initial Findings Continued
  - Forecast-Coordinated Operations (FCO) on the Feather and Yuba Rivers
    - FCO may have a potential for substantial improvements in flood protection
    - FCO would use similar tools as FBO

Yuba-Feather Supplemental Flood Control Project

- Initial Findings
  - Feasibility Study nearly completed
  - YCWA examined 37 measures, retaining five for probable implementation under the YFFP Program
  - Remaining measures will only meet part of the stated goal of 330-taf reduction at Shanghai Bend

Yuba-Feather Supplemental Flood Control Project

- Initial Findings Continued
  - Remaining Measures
    - Reservoir enlargement at New Bullards Bar
    - Outlet enlargement at New Bullards Bar
    - New Colgate tailwater depression
    - Forecast-based operations
    - Feather River levee setback

Sacramento and San Joaquin River Basins, Comprehensive Study

- Initial Findings
  - Produced extensive digital terrain models
  - Developed synthetic unregulated 30-day hydrographs for seven flood events: those with a 50%, 10%, 4%, 2%, 1%, 0.5%, and 0.2% chance of occurring in any year
  - Developed two separate reservoir operations models in each basin

Sacramento and San Joaquin River Basins, Comprehensive Study

- Initial Findings Continued
  - Geotechnical analysis was performed to determined stability and reliability of levees
  - Levee failure profiles were developed along both riverbanks
  - Developed hydraulics models for the river system from major flood control reservoirs to the delta

Sacramento and San Joaquin River Basins, Comprehensive Study

- Initial Findings Continued
  - Used the USACE HEC-FDA program to calculate expected annual damages
  - Used an Ecosystems Functions Model to evaluate existing and project conditions that favor various types of habitat

Sacramento and San Joaquin River Basins, Comprehensive Study

- Initial Findings Continued
  - Issued the comprehensive plan for the development of flood control projects
  - Identified guiding principles that would integrate flood damage reduction, ecosystem restoration and system-wide implications

Sutter County Feasibility Study

- Initial Findings
  - The schedule calls for release of a feasibility study report for public review in late 2004
  - The study has gathered extensive geotechnical and topographic information
  - Adapted models of the Comprehensive Study
  - Made a preliminary assessment of potentially viable alternatives.

LEVEES: INSPECTION, MAINTENANCE, AND ADEQUACY

- Initial Findings
  - Project levees are inspected on a quarterly basis
  - Project levees on the Feather River between Oroville Dam and Marysville have received either “Good” to “Outstanding” inspection reports
  - Good to outstanding means that they are maintained to USACE standards

LEVEES: INSPECTION, MAINTENANCE, AND ADEQUACY

- Initial Findings Continued
  - Private levees provide local protection
  - Private levees are not part of the SRFCP or the State's levee inspection program
  - The levee in Oroville along the left bank is a private levee

Emergency Action Plan (EAP) For The Oroville Facilities

- Initial Findings
  - The EAP is reviewed in the fall
  - Updates are submitted to the FERC by December 31st of each year
  - The last complete re-print was submitted to FERC on March 2000
  - The inundation maps were updated in October 2000

Emergency Action Plan (EAP) For The Oroville Facilities

- Initial Findings Continued
  - The EAP complies with Chapter 6 of the FERC Engineering Guidelines - revised, November 1998

Probable Maximum Flood for Lake Oroville

- Initial Findings
  - The last PMF was done in 1980
  - DWR is in the process of updating the PMF
  - The study is using the latest Hydrologic information developed by the NWS
  - Preliminary results indicate the PMF Peak Inflow is less than the 1980 estimates

Study Plan Status Continued

- Task 2: Update studies if needed
  - Review of the existing and in-progress studies shows that they are using the most current information
  - Only the PMF study is slated to be updated

Study Plan Status Continued

- Task 3: Coordinate with in-progress studies
  - DWR's Division of Flood Management is involved with the studies identified and coordination is on-going
  - DWR's O&M staff continues to coordinate with the YCWA on matters related to operations

Study Plan Status Continued

- Task 4: Write Report
  - The report is being compiled
  - Draft should be completed by next month